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ABSTRACT

The hypothesis of this study was that reading rate would be relatively constant (within a 15% range of the subject's mean reading rate) both within and across different difficulty levels of materials as long as the levels of difficulty remained at or below the subject's ability level. The subjects were 65 college students whose reading levels ranged from grades 9.8 to 16.0. The subjects read three reading passages (eighth, twelfth, and sixteenth grade reading levels), marking their progress through the passages at 30-second intervals. To make the purpose for reading constant, subjects were asked to complete a word recognition task after reading each passage. The data revealed an almost normal distribution of interval scores around each subject's average reading rate, lending support to the position that internal variation of reading rate was minimal. The subjects reading above the twelfth grade level tended to maintain their average reading rate for passages at the eighth and twelfth grade levels. When data for these subjects included the passage with the sixteenth grade reading level, not a single subject maintained their average reading rate. These findings offered clear support for the constancy of reading rate hypothesis. (RL)

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An Investigation into the Internal and External Rate Flexibility of Proficient Readers in Relation to the Difficulty Level of the Material

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Running Head: Flexibility

The traditional notion of reading flexibility can be summarized simply as the adjustments in rate made by the reader in response to changes either in the purpose for reading, or the difficulty level of the material. The proficient reader is often portrayed as slowing down when material becomes more difficult and/or the purpose more demanding; while, speeding up when the material becomes easier and/or the outcomes less crucial (Rankin, 1974). Two dimensions of flexibility have been identified by McCrackan (1965): internal and external. Using these terms, he differentiates between the way in which a reader might adjust rate when approaching different kinds of materials with divergent purposes (external flexibility) as compared with how a reader might change rates during continued reading of the same text (internal flexibility). Internal flexibility reflects rate variations within materials. External flexibility reflects rate variations between materials. McCracken concludes that external flexibility should be a natural by-product of internal flexibility.

A number of studies have been conducted recently into reading rate, as influenced by material difficulty, which suggest that such traditional

notions of reading flexibility may need to be reexamined. Some researchers have demonstrated, in fact, that reading rate tends to be relatively inflexible under experimental conditions. The unit of measurement in determining rate variation in most of the studies was typically something other than a word defined as what comes between two blank spaces [e.g., syllables per minute for Coke (1971) and Miller and Colman (1971) and standard words per minute for Carver (1978)].

Carver (1978) has proposed a theory of reading behavior called "rauding" which seems to account for these findings in a unique way. Rauding describes a subclass of general reading behavior which corresponds to what is often considered typical reading. A reader rauds a prose selection when each thought presented by the author is checked by the reader for congruity to context. Carver suggests that rate is constant for a given individual, regardless of material difficulty, as long as this material is at or below that person's reading ability level. He believes this is the rate at which efficiency, (i.e., time spent in relation to the amount of material comprehended) is maximized. Any adjustment in rate, whether the reader is speeding up or slowing down, will result in an overall sacrifice to this high level of efficiency. The goal of this research was to study and enhance our understanding of the internal and external rate flexibility of proficient readers. Following Carver's work the major hypothesis investigated was that reading rate is relatively constant both within and across different difficulty levels of materials as long as the level of material difficulty remains at or below the subject's ability level.

Methodology

One of the major problems in designing an experiment to explore this hypothesis is insuring that the subjects are and remain in a rauding (i.e., typical reading) mode throughout their interaction with the text materials. A large portion of past reading rate research is uninterpretable for failure to control for this factor. The rate variation (in words per minute) reported in these studies is just as likely an artifact of subjects switching back and forth from studying to skimming strategies as it is a result of true changes in the rate at which material is being read. The use of "words per minute" as the chief metric in these instances, whether or not it is the true unit of input, seems indefensible. In designing this experiment, therefore, every effort was made to insure that readers were in a rauding mode and to monitor that process without creating such undo demand characteristics that normal variation in behavior was impossible.

Subjects

The subjects for this study were 65 volunteer undergraduate students enrolled in reading methods class at The University of Texas at Austin. The overall reading achievement scores of this group, as measured by the National Reading Standards (NRS) test, ranged from 9.8 to 16.0 grade levels ($\overline{X}$ = 12.4).

Materials

The three passages used as reading material in this study were excerpted from selections found in the SRA Reading Labs IVa and IVc. The selection of passages was limited to those which conformed to a narrative prose style and content. Only the first 1000 words (approximately) from each of these selections were used in the study. Every effort was made to cross-validate

the approximate SRA assigned difficulty levels for the three passages (8th, 12th, and 16th grade levels) using the Dale-Chall, Flesch, and McGaughlin-Smog readability formulae. All of these measures produced a reasonable (i.e., within $\pm$ 1 year) rating in difficulty for the three passages around SRA levels.

A recognition test designed to check a superficial level of word recall was then constructed for each of the three passages. This task was included in an effort to make the purpose for reading constant (in terms of outcome expectancies) for all groups across all passages. While these tests were focused on the subjects accuracy of monitoring content at the word level, they were in no way designed to be or interpreted as indicators of the level of understanding.

The following algorithm was used in constructing the recognition tests which were administered immediately after each passage was read. First, a table of random numbers was used to select ten target words from each of the three treatment passages. Those words which were found on the Dale-Chall List of 2000 most frequent words were discarded and the selection process continued until the full compliment of ten words from each story was reached. Second, using the American Heritage (1971) Word Frequency Book the frequency of occurance for each of the ten words from each story was determined. From the rank order listing of the same reference text two distractors with a similar frequency as each of the ten target words were randomly selected. These thirty words (ten targets and twenty distractors) were arranged in a random three column testing sequence for each of the three passages. Testing booklets for the research project were constructed with the three

sets of treatment passages and accompanying recognition tests. These were arranged in random order to control for possible sequencing of difficulty effects.

Procedures

Testing for this study was conducted in large group settings. The subjects were told that the purpose of the research was to help us understand better the reading process in proficient readers. It was explained that they would be asked to read three rather lengthy prose passages at their normal rate and after each one, they would be given a short recognition test. It was also explained that while they were reading, they would be hearing a soft bell sound at 30 second intervals. Whenever they heard this sound, they were instructed to draw a line after the word they were reading at that moment and then continue on. A practice reading passage (10th grade difficulty level) was read through first with the subjects to familiarize them with the tone marking procedures. Rankin and Hess (1970) have shown that practice sessions such as this enabled subjects to adapt to similar testing conditions resulting in little, if any, impairment to their natural reading process.

Following the reading of a passage the subjects were directed to turn to the next page in their booklet which contained the recognition test. The subjects were asked to circle the 10 words out of the list of 30 which they thought had appeared in the story they had just read; they were warned that they should circle ten words and no more or their test could not be scored. The recognition test over the practice passage was used to familiarize the subjects with the testing procedures.

Following the explanation of procedures and the work on the practice exercises the subjects read each of the treatment passages with the tone marking system. After reading each passage, they took the recognition test for that passage. Once they completed a recognition test, they were directed to wait for the next tone sounding before beginning the next passage. This cycle repeated until each subject had finished working on the three treatment passages and recognition tests.

Data Analysis

For each passage read, an average rate of reading in syllables per minute was computed by taking the mean of the rates for a subset of five 30 second reading intervals in that passage. The five intervals were identified by skipping over the first interval on each passage, and then counting separately the number of syllables read in each of the next five intervals. A mean rate for each passage was computed individually for each subject using the average number of syllables read across the five intervals. If at least four of the five interval rates were within a $\pm$ 15% range of that subject's overall mean on the passage under consideration, the subject was considered to have been rauding that particular passage.* That is, internal flexibility was negligible.

The criterion for external flexibility was determined in a similar manner. Using the internal mean rates for each passage, an individual's grand mean rate was determined. If the interval means varied within the range of $\pm$ 15% of the grand mean, then the subject was considered to be

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* This tolerance range is somewhat arbitrary and is based largely on the work of Carver (1977) who found typical percent changes in reading rate around 12-14%.

relatively inflexible externally, i.e., only minimal adjustments in rate relative to changes in difficulty level.

Results and Discussion

The major hypothesis of this study regarding constancy of rate within and between passages was examined following two basic questions. These questions will serve to focus the reporting of data and discussion of findings:

Question 1: What proportion of subjects read the same continuous text material at a relatively constant rate?

On the eighth grade passage, 53% of the subjects remained within the ± 15% syllable rate parameter (N =55). The analysis is somewhat biased in that data from those subjects who did not have five complete interval rates on this passage were not included (i.e., the 10 fastest readers were excluded from this comparison, thus reducing the N from the original 65 to 55). A post-hoc analysis of these 10 readers using a ± 15% tolerance range around a mean rate determined using three rather than five interval rates revealed that a similar (approximately 60%) proportion of these readers also demonstrated internal inflexibility.

Only the performance of subjects who received grade level scores in excess of 11.9 on the NRS exam (N = 41) were examined for internal consistency on the 12th grade passage. Of these, 58% remained within the ± 15% syllable rate parameter. A total of 14 subjects (33%) satisfied the criterion for internal consistency on both the 8th and 12th grade passages.

The distribution of interval scores around individual grand means

for the 8th, 12th and 16th grade passages are presented in Table 1. The pattern of data in this table reveals an almost normal distribution of scores around each subject's average rate on all passages. These findings would lend support to the position that internal variation is minimal among most readers processing material in a rauding mode.

At first glance the data reported in Table 1 would seem to indicate approximately the same proportion and distribution of interval rates around subject's grand mean rates on the 16th grade passage as on the two easier passages. This is somewhat surprising in that Carver's explanation of a single optimal rate for processing easy material would lead us to predict that consistent patterns would be disrupted in difficult material, perhaps forcing the reader to shift into processing modes other than rauding (e.g., skimming, scanning, studying and combinations thereof).

It may well be that the experimental conditions which were designed to promote rauding behavior restricted subject inclination to shift into alternate reading modes and forced them to make adjustments in rate itself. Given this explanation, we would predict that this new rate, though perhaps constant internally, would be different from the optimal rate used in easier materials. The analyses to be reported relevant to the second research question support this prediction.

Question 2: What proportion of readers maintain a relatively constant rate when moving from one difficulty level of material to another?

The data from subjects whose ability level was in excess of 11.9 were analyzed first relative to variation around their mean rate (i.e., average) computed across the 8th and 12th grade passages. Within this group there

were 33 subjects with five valid interval rates on both passages. All of these subjects remained within ± 15% of their average rate on the two passages. 91% of these remained within ± 10% of their average rate while a full 73% remained within ± 5%. These data clearly would support the position that rauding rate is fairly consistent across materials of vastly different difficulty when the materials are below the readers' ability level.

Such is not the case when data from the 16th grade level difficulty passage is included. An analysis of subject variation around an individual's grand mean rate computed across the 8th, 12th and 16th grade passages revealed that not a single subject remained within the ± 15% criterion on the three interval passages.

Conclusions

The findings of this study offer clear support for the constancy of reading rate hypothesis when (1) subjects are in a "typical" rauding mode; and:(2) when the material is at or below their ability level. The test for constancy as applied in this study supports this hypothesis both for an internal (within passage) and external (between passage) perspective. Replications manipulating passage types, readers purpose, and demand characteristics, seem differently in order. if supported, the implicaitions for reading instruction are far reaching. At the practical level, we would be forced to consider a dramatic shift in flexibility training programs from their current focus of rate adjustment to perhaps an emphasis on the proper selection and efficient application of alternative reading strategies in response to variation in text difficulty and/or the prupose for reading.

Table 1

Distribution of Subject's Interval Scores
around Individual Grand Means on All Passages

	8th Grade Passage	12 Grade Passage	16 Grade Passage
-75% to -61%	1%	0%	0%
-60% to -46%	0%	0%	1%
-45% to -31%	1%	2%	3%
-30% to -16%	10%	6%	12%
-15% to -1%	38%	37%	38%
0% to +14%	34%	41%	30%
+15% to +29%	13%	11%	10%
+30% to +44%	2%	1%	3%
+45% to +59%	1%	1%	2%
+60% to +74%	0%	0%	1%

References

Carver, R. P. Is reading rate constant or flexible? Unpublished manuscript, University of Missouri at Kansas City, 1979.

Carver, R. P. Toward a theory of reading comprehension and rauding. Reading Research Quarterly, 1977-78, Vol. XII, No. 1, 8-63.

Coke, E. B. The effects of readability of oral and silent reading rates. Journal of Educational Psychology, 1974, Vol. 66, No. 3, 406-409.

McCracken, R. A. Internal versus external flexibility of reading rate. Journal of Reading, 1964, 8, 208-209.

Miller, G. R. & Coleman, E. B. The measurement of reading speed and the obligation to generalize to a population of reading materials. Journal of Reading Behavior, 1971, 48-56.

Rankin, E. F. The measurement of reading flexibility: Problems and perspectives (Reading Information Series: Where do we go?). Newark, Delaware: International Reading Association, 1974.

Rankin, E. F. & Hess, A. K. The measurements of internal (intra-article) reading flexibility. In G. B. Schick and M. M. May (Eds.) Reading Process and Pedagogy, Nineteenth Yearbook of the National Reading Conference, Volume I. Milwaukee: National Reading Conference, 1971, 254-263.